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SPECIFICATION FOR TELEVISION SWEEP GENERATORS

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SPECIFICATION FOR TELEVISION SWEEP GENERATORS

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SPECIFICATION FOR TELEVISION SWEEP GENERATORS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 11 March 1981, after the draft finalized by the Electronic Measuring Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 The performance of VHF Television Sweep Generators has been classified in three categories according to the requirements of TV service centres (Portable Model), TV manufacturing units (Industrial Model) and TV research and development organisations (Laboratory Model).

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the minimum performance requirements for VHF Television Sweep Generators designed to test, align, service and calibrate the TV sets manufactured in India.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions and explanation of terms shall apply.

2.1 Channels — India has been alloted various frequency bandwidths in the VHF range of electromagnetic spectrum for TV transmitters. These frequency bandwidths are called transmission channels or simply channels and they have been assigned specific numbers as per CCIR-B standards to denote the particular one. Channels 1 to 4 lie in Band I (40 – 70 MHz) and channels 5 to 11 in Band III (170 to 229 MHz). For the sake of convenience, the intermediate frequency band has also been denoted by the name of channel IF.

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*Rules for rounding off numerical values (*revised*).

2.2 Sound and Vision Carrier Frequencies — The channel IF carrier frequencies for sound and vision are 33·4 and 38·9 MHz, respectively. The channel IF has bandwidth of ± 3·5 MHz around its channel centre frequency of 36·15 MHz.

2.3 Centre Frequency of Channels — The centre frequencies in MHz for channels I to XI are : 44, 51, 58, 65, 178, 185, 192, 199, 206, 213 and 220 respectively. Their sound and vision carrier frequencies are, however, 2·75 MHz above and 2·75 MHz below their respective centre frequencies. The positions of sound and vision carrier frequencies around the centre frequency of channels I to XI are reverse to those for channel IF.

NOTE — Underlined values are being used at present.

2.4 Amplitude of Swept RF — The rms voltage of the fundamentals averaged over the width of the swept RF frequency is called the amplitude of the swept RF.

2.5 Flatness of Swept RF — The peak variations of the fundamental amplitude of a swept RF about their average values, denoted in dB, are called the flatness of the swept RF. Sometimes, these variations are measured around the amplitude of the centre frequency of the channel.

2.6 Width of Swept RF — The frequency difference between the extreme swept frequency excursions on the positive and negative sides of the centre frequency of a channel is called the width of the swept RF.

2.7 Frequency Markers — Due to nonlinear variation of swept RF frequency with time, it is very difficult to recognise the exact position of a specific frequency by manipulation or otherwise without the help of precise frequency markers. In order to mark the position of a particular frequency, while the detected output of the swept RF is displayed on the screen of a cathode ray tube, either the RF amplitude or intensity of the cathode ray beam is modulated at the instant this particular frequency occurs. For generating precise markers, crystal controlled oscillators have been used generally.

3. PERFORMANCE REQUIREMENTS

3.1 The performance requirements shall be according to Table 1.

TABLE 1 PERFORMANCE REQUIREMENTS

(*Clause* 3.1)

SL No.	CHARACTERISTIC	PORTABLE MODEL	INDUSTRIAL MODEL	LABORATORY MODEL
(1)	(2)	(3)	(4)	(5)
1.	*Channel*	IF and at least one channel from each Band I and III	IF and 2 to 10 or more	IF and 2 to 11 or more
2.	*Swept RF*			
	a) Amplitude	50 mV or more of fundamental frequencies across 75 ohms	100 mV or more of fundamental frequencies across 75 ohms	500 mV or more of fundamental frequencies across 75 ohms
	b) Width	± 4 MHz or more	± 5 MHz or more	± 10 MHz or more, preferably variable
	c) Flatness			
	i) between sound & vision markers	± 0·5 dB or better	± 0·25 dB or better	± 0·1 dB or better
	ii) over the 8 MHz width	± 1 dB or better	—	—
	over the 10 MHz width	—	± 0·5 dB or better	± 0·25 dB or better
	over the 20 MHz width	—	—	± 0·5 dB or better
	d) Harmonic distortion	— 15 dB or less for every harmonic relative to the fundamental	— 30 dB or less for every harmonic relative to the fundamental	— 30 dB or less for every harmonic relative to fundamental
	e) Sweep rate	50 Hz (fixed), synchronised to mains frequency	50 Hz (fixed), synchronised to mains frequency	5 to 100 Hz in at least 5 suitable steps and synchronised to mains frequency
3.	*Frequency Markers* (Frequency Distance from the Centre of the Channel Frequency)			
	a) Sound and vision	at ± 2·75 MHz for all the channels	at ± 2·75 MHz for all the channels	at ± 2·75 MHz for all the channels
	b) Additional	—	at ± 4·25 MHz for the IF channels	at ± 4·25 MHz for all the channels
	c) Precision continuous external marker	—	—	over the swept RF width

(*Continued*)

TABLE 1 PERFORMANCE REQUIREMENTS — *Contd*

SL. No.	CHARACTERISTIC	PORTABLE MODEL	INDUSTRIAL MODEL	LABORATORY MODEL
(1)	(2)	(3)	(4)	(5)
	d) Amplitude	IV peak-to-peak	2V peak-to-peak, continuously variable	2V peak-to-peak, continuously variable
	e) Accuracy or For indirect measurement	Better than 150 kHz marker oscillator accuracy better than 20 kHz	Better than 75 kHz marker oscillator accuracy better than 10 kHz	Better than 25 kHz marker oscillator accuracy better than 10 kHz
4.	*Attenuator*			
	a) Characteristic impedance	75 ohms, unbalanced	75 ohms, unbalanced	75 ohms, unbalanced
	b) Maximum attenuation	60 dB or more	80 dB or more	99 dB or more
	c) Resolution	2 dB or less	2 dB or less	1 dB or less, preferably continuously variable
5.	*Radiation at a Distance of 1 metre from the Front Panel*	100 µ V/m or less	10 µ V/m or less	10 µ V/m or less
6.	*ac Mains*			
	a) Voltage	240 V ± 10 percent, 1 ϕ	240 V ± 10 percent, 1 ϕ	240 V ± 10 percent, 1 ϕ
	b) Frequency	50 Hz	50 Hz	50 Hz
	c) Consumption	To be specified by the manufacturer	To be specified by the manufacturer	To be specified by the manufacturer
7.	*Accessories*			
	a) VHF Detector	30 MHz to 250 MHz or better	10 MHz to 300 MHz or better	10 MHz to 300 MHz or better
	b) VHF Balun	75 ohms to 300 ohms	75 ohms to 300 ohms	75 ohms to 300 ohms
8.	*Climatic Tests*			
	a) Dry heat test	←——+55°C for 2 hrs as per IS : 9000 (Part III)-1977*——→		
	b) Damp heat (cyclic)	←——— 2 Cycles as per IS : 9000 (Part V)-1977† ———→		
	c) Cold test	←—— −10°C for 2 hrs as per IS : 9000 (Part II)-1977‡ —→		
9.	*Bump Test*	← 1 000 Bumps, 40 g, as per IS : 9000 (Part VII/Sec 2)-1979§ →		
10.	*Operating Life*	←—The sweep generator shall be subjected to operating life test consisting of five hours' operation. one-hour rest period for total operating period of 1 000 hrs under laboratory atmospheric conditions.—→		

*Basic environmental testing procedures for electronic and electrical items : Part III Dry heat test.

†Basic environmental testing procedures for electronic and electrical items : Part V Damp heat (cyclic).

‡Basic environmental testing procedures for electronic and electrical items : Part II Cold test.

§Basic environmental testing procedures for electronic and electrical items : Part VII Impact test, Section 2 Bump.

INDIAN STANDARDS

ON

ELECTRONIC MEASURING EQUIPMENT

IS:

1885 (Part XLVII)-1977 Electrotechnical vocabulary: Part XLVII Digital electronic equipment
2320-1963 Methods of measurements for amplitude modulated radio frequency signal generators (30 kc/s to 30 Mc/s)
2321-1963 Requirements for general purpose amplitude modulated radio frequency signal generators (30 kc/s to 30 Mc/s)
3437-1972 General requirements for direct reading pointer indicator type electronic voltmeters (*revised*)
3886-1966 Minimum requirements for general purpose audio frequency signal generator (30 c/s to 30 kc/s)
3915-1966 Methods of measurements on audio frequency signal generators (30 c/s to 30 kc/s)
4330-1967 Methods of measurements on cathode-ray oscilloscope (dc to 10 Mc/s)
6700-1972 Requirements for general purpose cathode-ray oscilloscope
6756-1972 Technical documentation to be supplied with electronic measuring equipment
6767 Direct reading pointer indicator type ac/dc electronic voltmeters:
    (Part I)-1972 Methods of measurements
    (Part II)-1972 Up to 30 MHz
    (Part III)-1972 Up to 300 MHz
6769 Direct reading pointer indicator type ac electronic millivoltmeter:
    (Part I)-1972 Methods of measurements
    (Part II)-1972 With a frequency range of 2 Hz to 1 MHz
8290-1976 General purpose audio frequency output power meters
8573-1977 Digital electronic dc voltmeters and dc electronic analogue-to-digital converters
9176-1979 Method for specifying the functional performance of electronic measuring equipment
9177-1979 Method for specifying the functional performance of stabilized power supply apparatus
9281 Electronic weighing systems:
    (Part I)-1979 Terms and definitions
    (Part II)-1979 Methods of measurements
9285 Direct reading pointer indicator type ac electronic RF millivoltmeter:
    (Part I)-1979 Methods of measurements
    (Part II)-1979 Requirements
9298 Television pattern generators:
    (Part I)-1979 Requirements
    (Part II)-1980 Methods of measurements
9711-1980 Synchronizing pulse generators
9741 Video test signal generator:
    (Part I)-1981 Methods of measurements
    (Part II)-1981 Requirements

INTERNATIONAL SYSTEM OF UNITS SI (UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2